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ABSTRACT

The instructional design interactions, practices, and strategies used by three selected instructors teaching distance education courses at Texas A&M University were examined in a case study. Data were collected through unstructured interviews, participant observations, and examination of course documents. The three instructors were selected so that the sample would meet the following criteria: all instructors were tenured or tenured-track faculty with previous experience delivering distance education; each instructor represented a different department; all instructors used varying instructional delivery technologies; and all instructors used synchronous and asynchronous forms of interaction in their courses. The instructors' approaches varied and were shaped by their previous professional experience with distance learning and distance delivery technology. Instructor A used a Web- and videoconferencing-based instructional delivery system and met with students in a 3-day face-to-face field trip. Instructor B used a videoconferencing-based delivery system and conducted a 3-hour face-to-face summative meeting. Instructor C used a Web-based delivery system and held a 6-hour face-to-face orientation meeting. It was concluded that if instructors are to be successful distance educators, they must be capable of using at least the following types of interaction: instructor-learner; instructor-content; instructor-technology; instructor-facilitator; instructor-peers; instructor-support staff/technicians; and instruction-institution. (Contains 28 references.) (MN)

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Instructor Interactions in Distance Education Environments: A Case Study

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While many studies on distance education have focused on the role of distance learners (e.g., learner-centered instruction, learners' perceptions) there has been comparatively little focus on instructional design practices, skills, and interactions used by distance learning instructors. Instructors in distance education share a different set of interactions from distance learners. This paper presents the results of a case study that identified and documented instructional design interactions used by selected instructors teaching at a distance.

In distance education, the different instructional design models are one of the important factors that determine the amount and quality of interaction between instructors and their distant learners. Although different instructional design models use similar sets of components--conditions, methods, and outcomes (Reigeluth & Merrill, 1979)--instructors' paradigmatic approaches (e.g., behaviorist, constructivist, or critical theory) affect how they interact at a distance. These paradigmatic approaches have major consequences for instructional design and learner outcomes.

These theoretical differences make instructional design for distance education an important issue among developers of distance instruction and its associated interactions. For example, Gustafson and Branch (1997) explain that "Instructional development [*and design*] paradigms are manifested through conceptual and procedural models. Because paradigms are manifested through modeling, it is important to understand the process by which models are derived and the variety of functions process models serve" (p. 77). These paradigmatic approaches "serve as conceptual and communication tools for analyzing, designing, creating and evaluating, ranging from broad educational environments to narrow training applications" (p. 76).

The literature lacks research on the implications of and relationships between distance education instructional design models and instructor interactions--practices and skills--at a distance. Researchers criticize the literature in distance education because of lack of research rigor (McIsaac & Gunawardena, 1996) and call for more qualitative research (Windschitl, 1998). Except for anecdotal reports and a growing body of literature on faculty development procedures within distance education (Willis, 1994), little information is available about the effects of improvement efforts, or on the actual skill acquisition of distance education faculty (Thach & Murphy, 1995). Recent research, however, substantiates the paucity of instructor training with interactive videoconference (Taylor, 1999). This article extends the findings of a study that investigated these issues from a qualitative perspective (Mortera, 1999). The present article reveals the results of instructor interactions and instructional design skills used in distance education courses at Texas A&M University (TAMU).

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Design for Distance Education

A major premise for conducting this research was that "[D]istance education is much more than simply using technology in a conventional classroom ... It is about the consequences of using technology on such subjects as course design and delivery, interaction and learning, management and organization" (Moore & Kearsley, 1996, p. 2). The current instructional practice for many institutions is to simply add distance education courses "to existing academic programs with faculty being told to teach as they have always taught" (Cyrs, 1997a, p.53). This inadequate instructional practice does not allow for the full potential for quality distance education delivery, because it ignores fundamental differences between traditional face-to-face instruction and distance education. Distance education calls for special instructional design methods, models, and interactions (Merrill, 1994).

Because instruction at a distance involves technology, those who design and use distance course materials should be knowledgeable of instructional principles, technology, and the interaction process itself (Moore & Thompson, 1997). Faculty development is viewed as critical in assisting instructors to adapt their face-to-face teaching practices to a distance teaching mode (Dillon & Walsh, 1992). Specifically, distance instructors have to consider the course objectives, learner needs, instructional strategies, study guides, texts, and assessment strategies based on the uniqueness of the distance learning process itself.

While considerable research has concentrated on the role of the distance learner during the learning process (e.g., learner-centered instruction, learners' perceptions) (Moore & Kearsley, 1996; Schlosser & Anderson, 1994), comparatively little attention has been paid to instructional design practices, skills and interactions used by distance instructors (Thach & Murphy, 1995). As a result, little is known about the ways that educators enhance their own instructional design performance over time. There is need for research that is married to practice.

Instructor Interactions at a Distance

Garrison (1989) identifies two-way interaction as a critical feature of the educational process. Interaction is necessary not only for learners to receive feedback on their progress but also to engage the learners in active learning. Research indicates that higher levels of interaction typically lead to more positive attitudes toward and greater satisfaction with learning (Hackman & Walker, 1990).

Wagner (1994) cautions that two-way interactive technologies (e.g., video, audio, audiographics, and computer conferencing), "while capable of providing two-way interactivity, still depend on user skill to successfully bring about interaction in an instructional context" (p. 9). Research on interaction in distance education reveals that different types of instructional design methods and delivery technologies allow for differing degrees of interaction (Hanson et al., 1996).

Interaction in distance education typically focuses on the learner, occurring between the learner and the content, the learner and the instructor, and the learner with other learners (Moore, 1989). More recently it has been noted that the interaction between learners and the technology, particularly with high technology communication devices, is critical (Hillman, Willis, & Gunawardena, 1994). Hence, the four types of interaction for distance learners are: (a) learner-content, (b) learner-instructor, (c) learner-learner, and (d) learner-technology. Distance instructors develop similar, although relatively different, instructional interactions: (a) instructor-learner, (b) instructor-content, and (c) instructor-technology (see Table 1).

Table 1
Traditional View of Interaction in Distance Education

Learner Interactions	Instructor Interactions
Learner-Content	Instructor-Learner
Learner-Instructor	
Learner-Learner	Instructor-Content
Learner-Technology	Instructor-Technology

Instructional interactions in distance education result from a transactional distance situation, a learner control factor, immediacy and intimacy in terms of social presence, or within the four traditional types of distance interactions.

These instructional interactions are complex processes; the literature recommends that instructional designers keep them in mind to produce effective, efficient, and high quality distance education courses. Transactional distance, according to Moore (1993), includes the distance that exists in every educational relationship. This distance is established by the amount of dialogue occurring between the learner and the instructor, and the extent of structure that exists in the design of a course. On the other hand, social presence is a strong communication component that reduces isolation between the distant learner and other learners and instructor. Lack of social presence might affect learner's performance and outcomes during the instructional transaction (Short, Williams, & Christie, 1976). McIsaac and Gunawardena (1996) explain that social presence is "the degree to which a person is perceived as a 'real person' in a mediated situation" (p. 427). The notion is that social presence can be transferred both by the medium itself and by the people using the medium for interaction. Transactional distance and social presence are strongly interrelated and together influence the learner's control of the learning process. The possession of learner control is a chief factor in establishing positive or negative instructional interactions between the distant learner and the instructor. Learner control implies independence, competence, and support during distance interactions (Garrison & Baynton, 1987).

A review of the literature reveals a critique of interaction in distance learning situations. Cyrs (1997b) notes that "interactivity is frequently noted as the missing ingredient when comparing distance learning experiences with traditional face to face learning experiences" (p. 19). He argues, "For proponents of distance learning, interactivity offers the evidence on which to build a case that a distance learning experience is just as good as, if not better than, traditional face-to-face learning experiences" (p. 19). Instructional interaction is key for effective delivery of distance education courses and programs.

Rationale for the Study

The purposes of the study were to: a) document and analyze the basic instructional design components, interactions and practices used in distance learning courses at TAMU, and b) determine the fundamental instructional design skills and interaction abilities required for instructors to teach successfully at a distance. Several questions guided the procedures and their conceptualizations conducted in the study:

- Question 1: Within instructional design used in distance education, what are the instructional interactions utilized by selected distance education instructors at TAMU?

- Question 2: Do these interactions represent those recommended in the literature on distance education?

Method

A wealth of information is available from educators and social science investigators on performing qualitative research using basic or generic studies and case studies techniques and tools for data collection (field participant observation, structured and unstructured interviews, surveys and questionnaires, document analysis, and so on). A review of this literature identifies a number of necessary and basic steps. These steps include: 1) determining a focus for the inquiry; 2) determining the fit of the paradigm of the focus; 3) determining the fit of the inquiry paradigm to the substantive theory; 4) determining where and from whom data will be collected; 5) determining successive phases of the inquiry; 6) using human instrumentation; 7) collecting and recording data; 8) data analysis; 9) planning the logistics; and 10) planning for trustworthiness (Lincoln & Guba, 1985). The research study presented in this article followed these steps.

Within the study the preparation of the human instrument for the research centered on the sole investigator. Qualitative data were collected with a constructivist perspective by using fieldwork participant observation and interviews. These data were collected over a 16-week semester. The research procedure followed: 1) selecting instructors and distance learning courses to be observed (sampling), 2) pre-contacting the sample (faculty), 3) designing the questions for the unstructured interviews, 4) designing the classroom observation guidelines (key-points to be observed), 5) attending class sessions for instructor observation (gathering data on the field), 6) interviewing the subjects of study (three times each one), 7) collecting significant course documents (syllabi, textbooks, PowerPoint handouts, Web pages, evaluation forms), 8) analyzing data through interviews, field observations notes, and documents using Formal Content Analysis and Constant Comparative Method, and 9) analyzing the findings and developing the conclusions.

Sample Selection

The sample of this study included three TAMU faculty members who were teaching distance learning courses at the College Station campus during the fall semester of 1998. During that semester, TAMU offered 41 interactive videoconferencing courses to different locations around the State of Texas via the Trans-Texas Videoconference Network (TTVN) and other distance delivery systems including satellite TV, desktop videoconferencing, the Internet, and the Web.

Merriam (1998) describes the sample selection in qualitative research as "usually (but not always) nonrandom, purposeful, and small, as opposed to the larger, more random sampling of quantitative research" (p. 8). She continues, "The Investigator in qualitative research spends a substantial amount of time in the natural setting of the study, often in intense contact with instructors" (p. 8). Because the sample of instructors was small and nonrandom, their characteristics and their physical and social contexts were crucial in the selection.

The selection of the three distance learning instructors was based on the following criteria: 1) Instructors had to be teaching a course at a distance, with College Station as the local site; 2) they had to be tenured or tenure-track faculty with previous experience in delivering courses at a distance, 3) they had to represent three different departments within the university; 4) they each had to use varying kinds of technology for delivering instruction (e.g., videoconferencing, the Web, e-mail); and 5) they each had to use synchronous and asynchronous forms of interaction in their courses.

The three instructors were selected from *The TAMU Office of Distance Education Directory*. They were contacted personally through a direct person-to-person interview. The intent of this sampling was to obtain meaningful and unique information from the instructors.

Description of Instructor-Participants

The three instructors represented three departments in two colleges at TAMU: Instructor A was in the College of Agriculture and Life Sciences (COALS), and Instructors B and C were in the College of Education (COE). Table 2 summarizes the demographic data about the instructors.

Table 2
Descriptions of Instructors

	Instructors		
	A	B	C
Rank	Full Professor	Full Professor	Assistant Professor
College	COALS	COE	COE
Area of Expertise	Horticulture	Adult Education	Educational Technology
Course Taught	Citrus Production	Group Dynamics	Telecommunications
Level of Course	Undergraduate, Masters	Masters, Doctoral	Masters, Doctoral
Distance Education Teaching Experience	3 years	6 years	5 years
Distance Education Experience Prior to Teaching	0 years	0 years	10 years
Distance Training Received	1 years	0 years	4 years
Distance Training Provided to Others	0 years	0 years	11 years

The Instructors taught courses in their areas of expertise: Instructor A taught an undergraduate horticulture class about citrus production in COALS, Instructor B taught a graduate adult education class about group dynamics in COE, and Instructor C taught a graduate educational technology class about telecommunications in COE. Instructor A taught a technical course with lab activities; during the lab activities, the students conducted experiments and chemical test with plants and fruits. Instructors B and C taught theory-based courses, which included extensive discussions, reading, and analysis.

The instructors' experience in teaching distance courses varied greatly: Instructor A had three years teaching distance courses, Instructor B had six years teaching at a distance, and Instructor C had five years delivering courses at a distance. Teaching at a distance by these instructors included a wide range of faculty experiences and instructional interaction skills. In addition, they had many years of teaching traditional face-to-face courses: Instructor A had more than 30 years, Instructor B had 25 years, and Instructor C had more than 15 years.

The Instructors' distance education experience prior to teaching the course in fall 1998 varied: Instructor A and B had no previous distance education experience, while Instructor C had 10 years of experience within the field.

The distance training that the instructors' received varied: Instructor A had one year of distance education training given by the university prior to teaching at a distance. Instructor B had received no training prior to teaching the distance course, and Instructor C had four years of prior formal training. Likewise, the distance training that the instructors provided to others also varied:

Instructor A and B had never provided any distance education training, while Instructor C had provided distance training for 11 years previously.

Description of Distance Education Courses

During the 1990s at TAMU, distance education became an important method for delivering instruction statewide. Several colleges and departments of TAMU (e.g., Colleges of Education, Engineering, Medicine, and Agriculture and Life Sciences) used distance education to reach students who did not reside or attend class on the main campus. For example, the number of videoconferencing courses offered at a distance by The Texas A&M University System increased exponentially, growing from two courses in 1990 to more than180 courses in 1998 (Educational Broadcast Services, 1998). Faculty and administrators have recognized this growth along with a lack of appropriate distance learning instructional design skills and weak knowledge of instructor interactions with far site students.

In fall 1998, three TAMU distance education courses and their instructors were observed through fieldwork participant observation. The College of Agriculture and Life Sciences (COALS) offered one undergraduate course; Course A was about citrus production. The College of Education (COE) offered two graduate courses: Course B was about group dynamics, and Course C focused on telecommunications used in distance education environments. The duration of the courses was a full semester (four and one-half months), and each course was worth three credits. Table 3 summarizes the data about the courses.

Table 3
Descriptions of Distance Courses

Description of Courses			
	A	B	C
Number of Locations	3	2	19
Distance Delivery System	Web-based Videoconferencing	Videoconferencing	Web-based
Number of Students (on-site & far-site)	1st far-site = 3 2nd far-site = 4 On-site = 4 Total =11	Far site = 2 On-site = 13 Total = 15	Virtual Sites = 17
Level of Course	Undergraduate	Graduate	Graduate
Type of Course	Technical	Theory	Theory/Application
Instructional Strategies	1.5 hours Theory session/week; 3 hours Lab session/ week	3 hours combined theory/practice session/week	3 hours self-paced combined theory/practice sessions/week
Used of the Web	Information gathering	None	- Information gathering - Communication - Dissemination
Assistance with Technology	Support staff; Technical people	None	Support staff; Technical people; Mentors
Course Materials	Text book; Video tapes; Films; Audio tapes; Readings on Web	Text Book	Readings on Web; Text books; Course pack of readings
Supplementary Class Sessions	3-day face-to-face field trip	3-hour face-to-face summative meeting	6-hour face-to-face orientation meeting

Results

The results are presented by looking at each research question in turn. The two issues discussed are:1) the instructional interactions that faculty use in teaching courses via distance education; and 2) whether those interactions represent the ones considered to be desirable in the literature on distance education.

Instructor Interactions

Question 1: Within instructional design used in distance education, what are the instructional interactions utilized by selected distance education instructors at TAMU?

The results show that TAMU distance learning instructors developed instructional interactions that were similar to, although relatively different from, the learner's perspective. The instructors used the following types of interaction: (a) instructor-learner, (b) instructor-content, (c) instructor-technology, (d) instructor-facilitator, (e)instructor-peers, (f) instructor-support staff and technical personnel, and (g) instructor-organization. A major finding was that the types of instructional interactions vary depending on the point of view of learners, instructors, facilitators, authorities, or administrative and technical staff. Each one develops distinct and unique types of distance interaction. The conceptualization of just one perspective (e.g., the learner's viewpoint) does not allow for the understanding of the interaction phenomena within a distance education environment. Table 4 shows the types of interactions that each of the instructors used.

Table 4
Interactions of the Instructors

Interactions	Instructor A	Instructor B	Instructor C
Instructor-Learner	+	+	+
Instructor Content	+	+	+
Instructor-Technology	+	+	+
Instructor-Facilitator	+	-	-
Instructor-Peers	+	-	-
Instructor-Support Staff/Technical Personnel	+	-	+
Instructor-Institution	+	-	+

Note: "+" = used. "-" = did not use.

Question 2: Do these interactions represent those described as desirable in the research literature on distance education?

The findings revealed that the interactions observed in the instructors' teaching are not totally represented in the research literature on distance education. For example, the instructors experienced four types of interaction in addition to the types recognized as desirable in the literature-- learners with other learners, with the instructor, with the content (Moore, 1989), and with technology (Hillman, Willis, & Gunawardena, 1994). The four new interaction types identified in this study were: instructor-facilitator, instructor-peers, instructor-support staff/technical people, and instructor-institution interaction. Each interaction type fosters unique ways to deal with specific issues.

In addition, the three courses had different degrees of interaction with the support staff, technical personnel, and institution. Instructors A and C received major support from staff and technicians; in fact, they claimed their classes would have never succeeded without this help. This support was crucial for such tasks as setting up equipment, building web sites, posting readings and assignments, solving students' administrative problems, and taking care of the server.

However, Instructor B did not have staff or technical support at any of three videoconference sites, the class had difficulties in delivering the content, and they regularly experienced logistical problems related to technology. Table 5 summarizes the types of interactions that the instructors used in their distance courses.

Table 5

Instructor Interactions in Distance Education

Instructor
1. Instructor-Learner (traditional view)
2. Instructor-Content (traditional view)
3. Instructor-Technology (traditional view)
4. Instructor-Facilitator (new view)
5. Instructor-Peers (new view)
6. Instructor-Support Staff & Technical Personnel (new view)
7. Instructor-Institution (new view)

The results of the study show that the literature is right when it states that instructors who are familiar with equipment and communication technologies increase in a positive way the opportunities of interaction with distant learners --Instructors A and C, and those who are not decrease in a negative way the opportunities of interaction --Instructor B (Moore & Thompson, 1997).

Finally, the research findings support Hillman, Willis, and Gunawardena's (1994) idea of a learner-interface interaction needed in any distance learning situation. The authors note that interaction between the learner and the technology, which delivers instruction, is a critical component of the interaction model. They propose a new perspective, which includes understanding the use of the interface in all transactions. Learners lacking basic skills in using a communication medium spend inordinate amounts of time learning to interact with the technology and have less time to learn the content. For this reason, instructors and instructional designers must include learner-interface interactions that enable the learner to use the mediating technology first without dealing with course content (Hillman, Willis, & Gunawardena, 1994).

Conclusions

Based on the analysis of the unstructured interviews, participant observation fieldnotes, and course documents, the main conclusions of the study follow.

Instructional design components and variables differ in purpose, sequence, and implementation methods among the instructors. For example, some instructors disregard recommended design components such as an instructional analysis, which involves an examination of learner characteristics and learning environments. They may not identify learning objectives prior to teaching the course. Instead, these instructors rely on the course content for identifying course goals and determining instructional strategies and evaluation methods. Other instructors, however, conduct a needs assessment and instructional analysis, and they identify learning objectives before the beginning of a course. These findings are supported by research on whether or not instructors of online courses use the components of the general instructional design model--conditions, methods, and outcomes (Kodali, 1998). In a study that investigated instructors' use of these three design components put forward by Reigeluth and Merrill (1979), Kodali discovered that all of the instructors used some of the components of the model, whereas only a few used all of them in designing and delivering online courses. Specifically, the most frequently used component was methods, whereas the conditions were used least. Further, the application of instructional design stages, constituents, and variables may depend on the instructor's educational and philosophical background--behaviorist or constructivist. Behavioral-oriented instructors may focus on changing learners' behaviors, adoption of new attitudes, and positive transfer of learning.

Instructors who embody constructivism, on the other hand, tend to foster learners' reflection, critical thinking, and construction of meaning.

Instructors' previous professional experience with distance learning and distance delivery technology also shapes the purpose, sequence, and ways to implement instructional design variables. In spite of evidence to the contrary, "educators stubbornly persist in replicating face-to-face instructional experiences via technology" (Wagner, 1994, p. 8). The current study suggests that instructors with broad experience in distance education are likely to be more effective in interacting with far-site students, designing the course content, and using technology than are instructors with little or no distance education experience.

The conclusion that educational paradigms and instructors' previous instructional experiences guide their design and delivery of instruction at a distance stresses the need for training on appropriate instructional design principles and models suitable for specific distance education environments. Kodali (1998) suggests that "there is evidence of a move away from teacher-centered instructor. The instructor is no longer an expert or exclusive information provider" (p. 90). Instead, online instructors take on such constructivist roles as facilitator, collaborator, and guide, "due to a change in the nature of responsibilities of online instructors in the midst of technological advancements"(p. 90)--a view shared by Gunawardena (1992) and others.

Instructors must be capable of using at least seven types of interactions, unlike their students, who are likely to use fewer types of interaction. Three instructor interactions shared with students are instructor-learner, instructor-content, and instructor-technology interaction. The remaining instructor interactions include instructor-facilitator, instructor-peers, instructor-support staff/technicians, and instructor-institution interaction. The quality and quantity of instructional interactions depend on the characteristics of the learners, the institution, costs, distance delivery technologies, instructional design model applied, instructional strategies used, course content, and course materials. Personal and unique styles of each instructor determine the dynamic of the instructional interactions

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